

## CLAIMS

1. A catalyst comprising

(A) a tantalum compound, and

(B) an organic metal compound, wherein the organic metal  
5 compound (B) comprises at least one group selected from the group  
consisting of the following (1) to (5):

(1) a branched or cycloalkyl-substituted primary alkyl  
group having 4 to 15 carbon atoms,

(2) an aryl-substituted primary alkyl group having 7 to  
10 15 carbon atoms,

(3) a 3-alkenyl group having 4 to 15 carbon atoms,

(4) a secondary alkyl group having 3 to 15 carbon atoms  
which may be substituted with an aryl group or a cyclic alkyl  
group having 3 to 15 carbon atoms, and

15 (5) a secondary alkenyl group having 4 to 15 carbon atoms.

2. The catalyst according to claim 1, wherein the tantalum  
compound (A) is a tantalum halide.

3. The catalyst according to claim 1 or 2, wherein the  
organic metal compound (B) comprises at least one group selected  
20 from the group consisting of isopropyl, isobutyl, sec-butyl,  
homo-allyl, cyclopentylmethyl, cyclohexylmethyl, 1-phenethyl,  
and 2-phenethyl groups.

4. The catalyst according to claim 1 or 2, wherein the  
organic metal compound (B) comprises isobutyl group.

25 5. The catalyst according to claim 1 or 2, wherein the  
organic metal compound (B) is an isopropylmagnesium halide, an  
isobutylmagnesium halide, a sec-butylmagnesium halide, a  
cyclopentylmagnesium halide, a cyclohexylmagnesium halide, a  
1-phenethylmagnesium halide, a 2-phenethylmagnesium halide,

isopropyllithium, isobutyllithium, sec-butyllithium,  
cyclopentyllithium, cyclohexyllithium, 1-phenethyllithium,  
2-phenethyllithium, triisopropylaluminum,  
triisobutylaluminum, tri-sec-butylaluminum,  
5 tricyclohexylaluminum, isobutylaluminum dichloride,  
diisobutylaluminum chloride, a diisobutylaluminum halide, a  
modified methylaluminoxane, isobutylaluminoxane,  
tetraisopropyltin, isopropyltrimethyltin, tetraisobutyltin or  
a diisobutyltin dihalide.

10 6. The catalyst according to claim 1 or 2, wherein the  
organic metal compound (B) is triisobutylaluminum, a modified  
methylaluminoxane, or isobutylaluminoxane.

7. The catalyst according to any one of claims 1 to 6,  
wherein the amount of the organic metal compound (B) is from  
15 0.5 to 3 moles in terms of the alkyl group(s) per mole of the  
tantalum compound (A).

8. The catalyst according to any one of claims 1 to 7,  
wherein the olefin is ethylene.

9. The catalyst according to any one of claims 1 to 8,  
20 which is obtained by contacting the tantalum compound (A) with  
the organic metal compound (B).

10. An olefin-trimerizing process, which comprises  
trimerizing an olefin in the presence of the catalyst according  
to any one of claims 1 to 9.

25 11. The olefin-trimerizing process according to claim  
10, which is carried out at an absolute pressure of from normal  
pressure to a pressurized pressure.

12. The olefin-trimerizing process according to claim  
11, wherein the absolute pressure is from normal pressure to

30 MPa.

13. The olefin-trimerizing process according to any one of claims 10 to 12, which is carried out at a temperature of 150°C or lower.

5        14. The olefin-trimerizing process according to claim 13, which is carried out at a temperature of 10 to 80°C.

15. The olefin-trimerizing process according to any one of claims 10 to 14, which is carried out in the presence of a solvent.

10        16. The olefin-trimerizing process according to claim 15, wherein the solvent is an aromatic compound.

15        17. The olefin-trimerizing process according to claim 15, wherein the solvent is at least one selected from the group consisting of benzene, toluene, xylene, chlorobenzene and dichlorobenzene.

18. The olefin-trimerizing process according to any one of claims 10 to 17, wherein the olefin is ethylene.